Overview of Lake Okeechobee Protection Program

The Lake Okeechobee Protection Program (Chapter 00-130, Laws of Florida) was passed by the 2000 Legislature. This Program committed the State of Florida to restore and protect Lake Okeechobee. This will be accomplished by achieving and maintaining compliance with water quality standards in Lake Okeechobee and its tributary waters, through a watershed-based, phased, comprehensive and innovative protection program designed to reduce phosphorus loads and implement long-term solutions, based upon the Lake's Total Maximum Daily Load (TMDL). The Program sets forth a series of activities and deliverables for the coordinating agencies: the South Florida Water Management District (hereafter, District); the Florida Department of Environmental Protection (hereafter, FDEP); and the Florida Department of Agriculture and Consumer Services (hereafter, FDACS). This is the third annual report to the Legislature, and summarizes the water quality and habitat conditions of the Lake and its watershed, implementation activities of the past year including the status of the Lake Okeechobee Construction Project, challenges, and unresolved issues. The report also identifies areas for future legislative support to successfully implement the state's commitment to protect and restore this resource.

Water Quality and Habitat Conditions in Lake Okeechobee and the Watershed

Lake Okeechobee functions as the central part of a large, interconnected aquatic ecosystem in south Florida and as the major surface water reservoir of the Central and Southern Florida Flood Control Project. The Lake provides a number of values to society and nature including water supply for agriculture, urban areas and the environment, flood protection, a multimillion dollar sport and commercial fishery, and habitat for wading birds, migratory waterfowl, and the federally endangered Everglades Snail Kite. These values of the Lake have been threatened in recent decades by excessive phosphorus loading, harmful high and low water levels, and rapid expansion of exotic plants.

Specific Issues of Concern

Water Quantity

- During 2002, water levels in the Lake declined from near 15 feet in January to a low of 11.6 feet in June, and then increased rapidly, back to above 15.5 feet in the fall.
- During spring, water deliveries were made from the Lake to protect Vallisneria (tapegrass) beds from high salinity in the Caloosahatchee River.
- During fall, flood control discharges were made from the Lake to the Caloosahatchee and St. Lucie estuaries, the Water Conservation Areas (WCAs) and the lower east coast canal system.

Ecological Attributes

- As a result of favorable water levels in 2000-2002, there has been a strong recovery of both submerged and emergent plants around the Lake's shoreline.
- A yearly survey of submerged plants in August 2002 documented a total of 43,000 acres of vegetation. This was an increase from the 34,800 acres found in 2001.
- More importantly, the submerged vegetation in 2002 was dominated by plants that provide good fish habitat (peppergrass, eelgrass, coontail, Hydrilla) compared to smaller plants (shrimpgrass) in 2001 that did not provide that value.

- A detailed analysis of vegetation data collected bimonthly from 1999 to 2002 indicated that a period of two years was needed for recovery from the high water stress of the late 1990s.
- Particularly good recover of emergent plants has occurred in shoreline areas where muck was removed in a joint effort of the SFWMD, FFWCC, and the USACE.
- Large areas of torpedo grass control from 2001 are showing signs of long-term effectiveness.

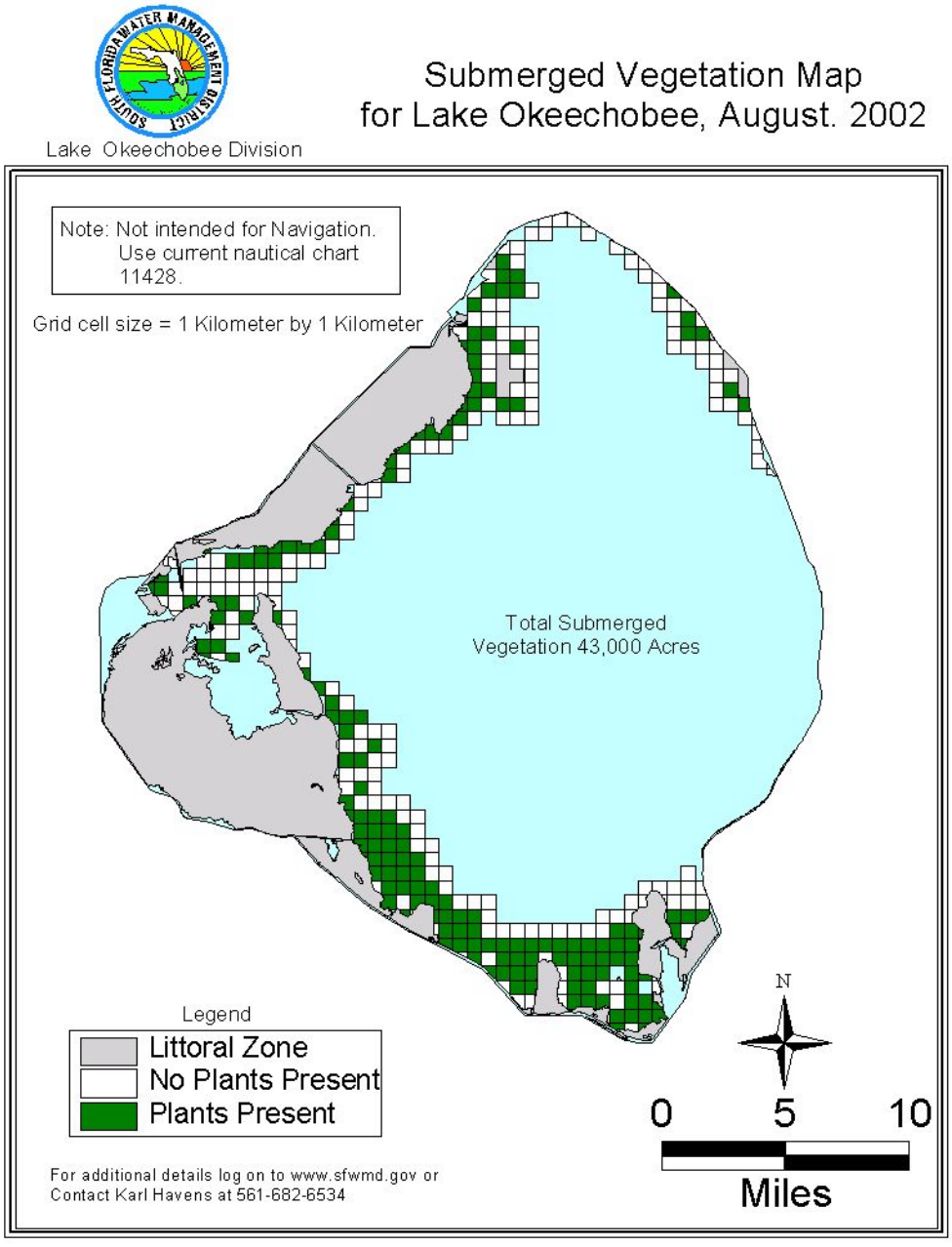

Figure 1. Distribution of submerged aquatic vegetation in Lake Okeechobee as of August 2002.

Water Quality

- Total phosphorus concentrations in the Lake have doubled since the early 1970s, now averaging approximately 117 parts per billion (ppb).
- There is a high rate of phosphorus loading from both the watershed (external loads) and from the mud sediments within the Lake (internal loads).
- During 2002, shoreline areas of the Lake with dense submerged vegetation displayed good water quality, in terms of nutrient concentrations and water clarity.
- Algal blooms did not occur in the areas with dense plants.
- Further offshore, blooms periodically occurred in the summer and fall, but they were short-lived and not widespread.

Measured annual phosphorus load to the Lake from the watershed declined extensively in 2000 compared to all years in the past decade (Table 1). In this year south Florida experienced one of the worst droughts on record. Because inflows were reduced dramatically, so were loads to the Lake. Despite the low loads to the Lake, the 2000 Lake Okeechobee Total Maximum Daily Load of 140 metric tons (FDEP 2000) is exceeded by 318 metric tons. The reason is that the TMDL is based on a five year average to account for variations in water flow and loads. In 2001, the annual load was much higher because of higher inflow. The relevant data for the last 11 years are included in the following table on historical loads for the entire watershed entering Lake Okeechobee.

Table 1. Total Phosphorus Loads (in metric tons) to Lake Okeechobee 1991-2001

Year	Measured Load [a]	Long-term Load (5-yr moving average) [a]	Long-term Over-target Load (5-yr moving average) [ab]
1990	396	424	284
1991	445	415	275
1992	388	393	253
1993	296	375	235
1994	580	421	281
1995	683	478	338
1996	200	430	290
1997	470	446	306
1998	780	543	403
1999	670	561	421
2000	169	458	318
2001[c]	607	539	399

[a] includes an atmospheric load of 35 metric tons per year based on the Lake Okeechobee TMDL (FDEP 2000)
[b] Target is the Lake Okeechobee TMDL of 140 metric tons (FDEP 2000) compared to a five year moving average
[c] Year 2002 data will not be quality controlled/quality assured until June 2003

Restoration Strategy

An integrated watershed and Lake management strategy is being used to improve the condition of Lake Okeechobee. This strategy is based on the implementation of phosphorus source control programs which include Best Management Practices (BMPs) at the parcel level, implementation of sub-basin and regional phosphorus control technologies, and in-Lake remediation projects. The information obtained from parcel-

scale activities, the existing Works of the District (WOD) Program, Phase I of the Lake Okeechobee Construction Project, and Lake inflow structure monitoring will be evaluated to assess the progress towards achieving the current and proposed phosphorus discharge standards into Lake Okeechobee.

Achieving the level of phosphorus load reduction required by the TMDL will require actions at the three scales previously described. At the parcel-scale individual landowners, both agricultural and nonagricultural, will implement measures to reduce the amount of phosphorus migrating off their parcels of land. Use of BMPs implemented as a non-regulatory process is considered the most appropriate parcel-scale action. The cooperating agencies are working together to identify applicable BMPs for the major land uses in the watershed.

The District continued to implement the WOD program. The program has five key responsibilities. The District permits all non-dairy land use activities in the 14 priority basins as outlined in the SWIM plan and identifies points of surface water discharge from public and privately owned lands. The District documents compliance with the appropriate SWIM total phosphorus concentration limitations for lands which have received general and individual permits. The District documents the water quality from the permits that exceed the phosphorus concentration limitations established in the Lake Okeechobee Works of the District Chapter 40E-61 Florida Administrative Code. The District requires corrective action plans to reduce phosphorus runoff for those permits exceeding phosphorus concentration limitations. And the District brings enforcement actions against permit holders who do not voluntarily take adequate corrective actions to achieve compliance.

The FDACS and District are working together to develop and implement additional BMPs and Best Available Technologies (BATs) on the dairies in the watershed. In addition, FDACS is developing a voluntary BMP implementation program for other agricultural activities including cow-calf operations, vegetables, and citrus, modeled on the success of the citrus BMP efforts in the Indian River Lagoon watershed. Landowners who choose not to participate in the voluntary BMP programs will be required to monitor the quality and quantity of water leaving their properties to demonstrate compliance with existing and future phosphorus targets. The FDEP, FDACS, and District have been supporting the development of BMPs for beef cattle through a cooperative project with the MacArthur Foundation and Archbold Biological Station.

In-Lake restoration activities include the control of exotic and invasive (cattail) vegetation, the removal of an organic berm along the northwest shore of the Lake, habitat restoration on the natural islands at the south end of the Lake, and sediment dredging projects along key access points to the Lake and/or rim canal.

The Lake Okeechobee Protection Act defined Phase I of the Lake Okeechobee Construction Project as those project features designed to improve the hydrology and water quality of Lake Okeechobee and downstream receiving waters, consistent with the recommendations included in the South Florida Ecosystem Working Group's Lake Okeechobee Action Plan. Phase I of the Lake Okeechobee Construction Project includes several Critical Restoration projects that were authorized in the Water Resources Development Act of 1996. These include the isolated wetlands restoration projects and the construction of two stormwater treatment and detention facilities in the priority basins. Phase I also includes the Comprehensive Everglades Restoration Plan's

(CERP) project for the Taylor Creek/Nubbin Slough Reservoir-assisted Stormwater Treatment Area (RaSTA). A watershed assessment was initiated in January 2002 to define the extent and features of the CERP projects in the northern Lake Okeechobee watershed, including the Taylor Creek/Nubbin Slough RaSTA.

Major Accomplishments and Status/Progress of Restoration Activities

Highlights of the 2002 efforts include the following:

- The coordinating agencies (Interagency Coordinating Group) continue to meet monthly to coordinate efforts and discuss, identify, and resolve issues. Other key partners that participate include the Institute of Food and Agriculture Sciences of the University of Florida (IFAS), the USDA Natural Resources Conservation Service (NRCS), and the Florida Fish and Wildlife Conservation Commission (FFWCC)
- The coordinating group has assigned lead agencies and teams for each of the major tasks outlined in the law (see attached Lake Okeechobee Protection Program, Program Management Plan).
- Agricultural Nutrient Management Assessments have been completed for all active dairies in the priority basins, representing over 31,000 acres. An additional 14,453 acres, covering buyout dairies, have also had nutrient management assessments completed. Contracts are being negotiated with engineering firms to develop detailed structural and management modifications for each active dairy to bring it into nutrient balance (imports = exports). 40,578 acres of cow/calf operations are currently in the advanced stages of the Conservation planning process. Over 40 additional cow/calf producers within the priority basins, representing 137,784 acres, have also agreed to participate in the planning process. Collectively these activities cover 224,040 acres which represents nearly 88% of the agricultural acreage in the four priority basins.
- The District awarded a contract to initiate the development of a watershed assessment for the Lake Okeechobee Watershed CERP Project.
- Four of the 12 Phosphorus Source Control Grant projects have been completed.
- The District has completed Phase I of an economic analysis to evaluate the cost-effectiveness of different phosphorus control alternatives (PCAs). Benefits and costs of each alternative to the landowners, agencies, and the regional economy were described and quantified, and additional alternative technologies identified in the Act will be evaluated in Phase II. Phase II will also include benefit-cost modeling and analysis of selected combinations of on-site and regional technologies. This information will be used in the development of the Lake Okeechobee Protection Plan.
- The District, in cooperation with the coordinating agencies, developed the Lake Okeechobee Regional Public-Private Partnership Program. No contracts were awarded under the first solicitation. The second solicitation was released November 15, 2002 and proposals are due January 15, 2003.
- The District assisted the FFWCC with funding to continue removing portions of the organic berm along the northwest shore of Lake Okeechobee.
- The District, in partnership with the FFWCC, will be removing remnant agricultural levees on Torry, Kreamer, and Ritta Islands in the south end of the Lake, to re-establish hydrologic connections between the Lake and the islands.
- Dredging of sediments in the Industrial Canal was completed.
- The 2002 Draft Lake Okeechobee SWIM Plan Update has been completed and has been distributed for public and agency review. The final approved plan is expected in early 2003.

- A Lake Restoration Assessment Plan has been developed. It includes a set of quantitative performance measures that will be used to evaluate success in restoring the Lake, and the methods that will be used to evaluate these measures.

A status update on the primary components of the Lake Okeechobee Protection Program is presented in the following sections. In addition, a description of each project, goals and objectives, and activities accomplished in 2002 are provided in the appendix.

Lake Okeechobee Construction Project (373.4595(3)(b)), F.S.

Phase I of the Lake Okeechobee Construction Project includes the implementation of three elements specifically identified in the Lake Okeechobee Protection Program. The following is a summary of the actions taken in 2002 to expedite completion of these elements.

Lake Okeechobee Water Retention/Phosphorus Removal Critical Project

- Construction of one isolated wetland/retention area was completed in June 2002.

- Construction of the remaining isolated wetlands/retention areas will be complete in 2003.
- Preparation of construction contract plans and specifications are under way and will be complete by February 2003 for the two pilot Stormwater Treatment Areas (Grassy Island and New Palm Dairy).
- Construction of the pilot Stormwater Treatment Areas will be initiated in 2003.

Tributary Sediment Removal Pilot Project

- Implementation of two alternative sediment trap methods was completed in March 2002 and monitoring was initiated in July 2002. Due to problems with vandalism at the site, monitoring was disrupted. The length of the monitoring program will be extended to account for the period of missing data.

Lake Okeechobee Watershed Project (LOWP)

- The four CERP Projects in the northern Lake Okeechobee watershed have been merged into one planning effort to realize efficiencies that will result from the integration of project features to maximize benefits.
- The District awarded a contract for technical services to assist in the development of Project Implementation Reports (PIRs) for the Lake Okeechobee Watershed Project. Preparation of a watershed assessment, the first step in the development of a PIR was initiated.
- As part of the watershed assessment, development of evaluation criteria, definition of existing conditions, forecast of future conditions, development of a spatial data model, and design of a basin-scale monitoring program have all been completed.
- Planning for the Lake Okeechobee Watershed Project is being integrated into the development of interagency strategies and actions. This will continue as part of the development of the Lake Okeechobee Protection Plan to be submitted to the Legislature by January 2004.
- The schedule for completion of the four CERP projects in the LOWP calls for completion of construction by 2013. Within that timeframe, the Taylor Creek/Nubbin Slough Reservoir Assisted Stormwater Treatment Area (RaSTA) is scheduled for completion in 2010.

Phase II of the Lake Okeechobee Construction Project calls for the development and implementation of those additional projects necessary to achieve the TMDL of 140 tons of phosphorus discharged to Lake Okeechobee by 2015. The specific plan that documents the construction facilities, size and location in the watershed, a construction and land acquisition schedule, and detailed schedule of costs must be developed by January 2004. In addition, the plan must identify potential impacts on wetlands and state-listed species of concern that could occur as a result of the construction project and develop alternatives to mitigate and minimize these impacts, as appropriate. A number of current projects will be providing critical information necessary to develop the plan including the CERP watershed assessment, the implementation and success of BMPs and BATs, and evaluations of alternative phosphorus reduction approaches.

Lake Okeechobee Watershed Phosphorus Control Program

A considerable effort has been expended in 2002 on watershed phosphorus control projects by the District, FDACS, FDEP, and the NRCS (Figure 2). Highlights of these activities are listed below. Additional information is provided in the appendix.

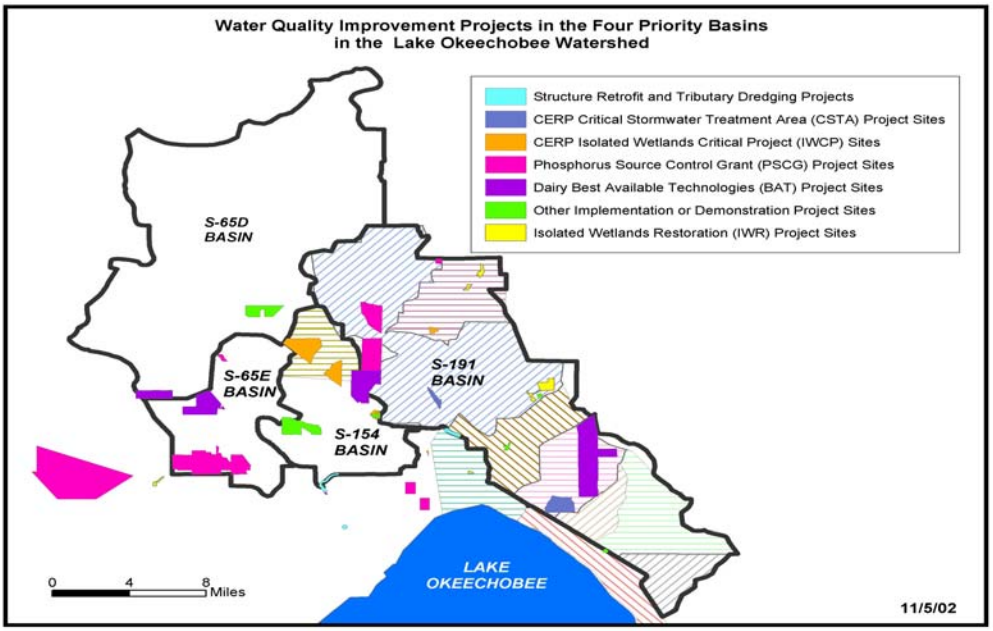

Figure 2. Water Quality Improvement Projects in the Four Priority Basins in the Lake Okeechobee Watershed.

- The coordinating agencies agreed that the first step to successfully control phosphorus is to develop a tool to determine specific on-farm current and future phosphorus sources and the best mechanisms to control those sources. The development of this tool, called an Agricultural Nutrient Management Assessment (AgNMA) was completed this year.
- AgNMAs have been completed for all active dairies in the priority basins, representing over 31,000 acres. An additional 14,453 acres, covering buyout dairies, have also had nutrient management assessments completed.

- 40,578 acres if cow/calf operations are currently in the advanced stages of the Conservation planning process. This activity is being coordinated with the USDA/NRCS to expedite the planning effort. It is anticipated that these initial cow/calf properties will have completed the planning process by the end of December 2002. Over 40 additional cow/calf producers within the priority basins, representing 137,784 acres, have agreed to participate in the planning process (Figure 3).

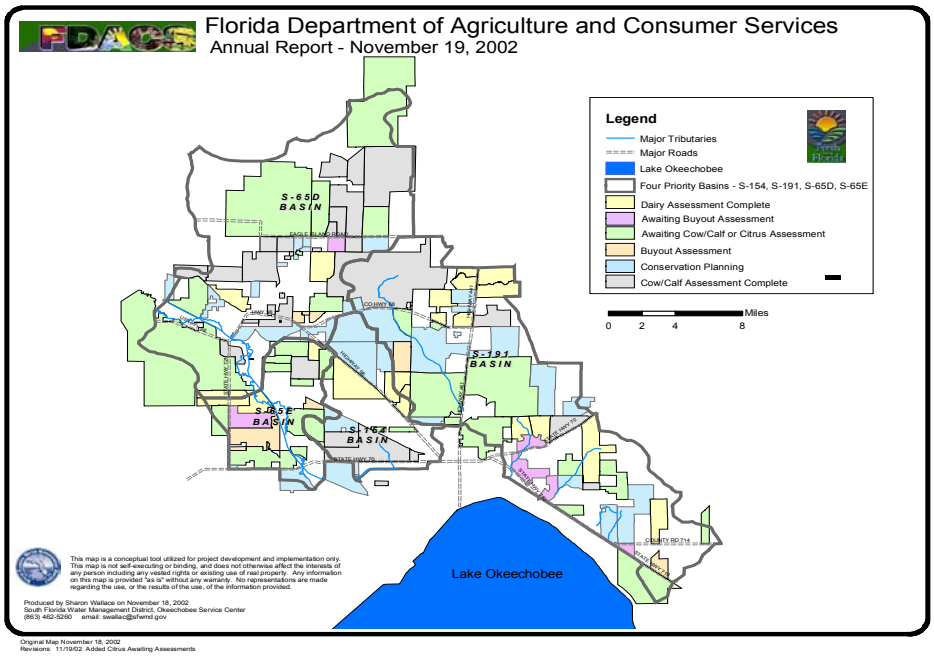

Figure 3. Florida Department of Consumer Services Landowner Contacts in the Four Priority Basins in the Lake Okeechobee Watershed.

- Contracts are being negotiated with engineering firms to develop detailed structural and management modifications to bring each dairy into nutrient balance.
- To further expedite the development of conservation plans, FDACS has contracted with the IFAS to provide training and certification to third parties wishing to participate in the development of nutrient management and/or conservation plans.
- FDACS is in the administrative rule making process to formally adopt BMP manuals aimed at cow/calf operations and has completed the adoption of an administrative rule covering a BMP manual for citrus producers.
- FDACS and the NRCS have executed an interagency Memorandum of Agreement that commits the available resources within the two organizations to cooperate in the delivery of nutrient and conservation management planning to agricultural landowners in the watershed. In addition to leveraging state and federal dollars as much as possible for planning and cost share programs, the two organizations are working cooperatively with other partners in the preparation of a Public Law 566 (PL-566) Small Watershed proposal for consideration by Congress to greatly increase the amount of federal funding available for BMP planning, implementation and cost share.
- IFAS, using funds provided by the District, FDACS, and FDEP, has initiated two large agricultural BMP demonstration and effectiveness studies.

- The District, in cooperation with an interagency team, awarded funding to 12 phosphorus-reducing projects under the State-appropriated Phosphorus Source Control Grant Program in 2001. Four of the 12 projects have been completed. Of the remaining eight, three are in construction and five are in design/permitting.
- The District, in cooperation with an interagency team, has evaluated nine sites under the State-appropriated Isolated Wetland Restoration and Creation Program. Restoration designs are being developed for two of the sites.
- The District has completed the update of the watershed phosphorus budget for the northern watershed. The Lake Istokpoga and Upper Kissimmee Chain of Lakes watershed phosphorus budget assessments have also been initiated. Existing data for the southern contributing basins is being compiled by staff to complete the entire watershed.
- The District continues to implement the Lake Okeechobee Works of the District (WOD) Rule (Chapter 40E-61, F.A.C.). In 2001, fifty-one permit actions were processed. These included 7 general permits, 10 permit transfers, 14 new permits, and 20 permit modifications. Three permits were amended to incorporate phosphorus control plans to correct water quality problems.
- Two basin water quality surveys were conducted in C-41 and Fisheating Creek basins. Samples were collected in each basin to identify areas that may be a source of high phosphorus concentrations.
- WOD staff also conducted six water quality surveys on permitted parcels not meeting the WOD rule limit to determine the source of high phosphorus concentrations. In addition, 25 compliance inspections were completed for permits which have been amended to include phosphorus control plans.
- FDACS is presently developing a row crop BMP manual for use in the Okeechobee watershed.
- FDEP has contacted all wastewater facilities and residuals haulers that land-apply biosolids in the Lake Okeechobee Watershed and has modified all permits. Two sites continue to receive biosolids and have submitted an agricultural use plan that limits applications based on phosphorus. Additionally, a phosphorus load study addressing biosolids application has begun and is under review by FDEP.
- IFAS has developed interim nutrient application rates for home lawns, and parks and recreation areas. FDEP is currently working with IFAS on establishing state-wide nutrient application rates for turf grasses.
- FDEP, in consultation with interested parties, has developed interim measures, BMPs, or other measures necessary to reduce phosphorus load reduction from nonagricultural nonpoint sources. FDEP is currently developing an Okeechobee specific BMP manual that will be available in the December 2002-January 2003 timeframe. The manual will include the best management practices that are available in the Florida Land Development Manual, The Florida Stormwater, Erosion, and Sedimentation Control Inspector's Manual, and A Guide to Environmentally Friendly Landscaping – Florida Yards and Neighborhoods Handbook.
- FDEP has issued a contract for the development of the Okeechobee County/City and Glades County/Moore Haven stormwater master plans.

The following District contracts are completing their first year of activities and most are in the permitting stage or implementation phase:

- The District and FDEP are jointly conducting a biosolids fate and transport study to identify any environmental and health problems associated with the use of residuals and chicken manure in the watershed. Results will include BMP application rates for landowners. The waste materials have been characterized and construction if the

field study site has been completed. Monitoring will be initiated after the residuals have been applied.

- The District evaluated technologies for the dairies under the Best Available Technology (BAT) project. An edge-of-farm stormwater detention pond for water reuse and a chemical treatment system was the highest ranked technology to meet the water quality goals in the shortest time period. Phosphorus load monitoring is being conducted and design of the systems is substantially complete for the three participating dairies.
- Two tributary dredging projects on L63N and L62 have been initiated to remove phosphorus-laden sediments and restore conveyance capacity.
- Two structure retrofit projects (S-192 and PC01 L59) have been initiated for water quality improvement. These projects include sediment removal and trapping, vegetation barriers, and potential operational changes.
- Upgrades of the EAAMOD field scale model and WAMView farm scale model for use in the Lake Okeechobee watershed were completed.
- The third year of data collection was completed for evaluating the phosphorus fertilizer requirements for the pasture cover Stargrass. This project is also evaluating the use of soil amendments to reduce phosphorus in surface water runoff.

Lake Okeechobee Research and Water Quality Monitoring Program

The District, in cooperation with FDEP and FDACS, will complete an extensive research and water quality monitoring program to provide the necessary information for the Lake Okeechobee Protection Plan. Research projects identified in the Legislation will be completed by 2004. Water quality and ecological monitoring will be ongoing for the life of the Lake Okeechobee Protection Program, collecting data needed to evaluate program success. At this time baseline data collection is underway. Current monitoring efforts include the following projects:

- Lake Okeechobee Inflow/Outflow;
- Dairies under the 1987 FDEP Dairy Rule;
- In-Lake water quality monitoring;
- In-Lake ecological monitoring (phytoplankton, submerged and emergent plants, and zooplankton);
- All non-dairy land uses permitted under District Rule 40E-61 for permit compliance. A total of 160 sites on 86 permitted parcels are monitored biweekly.

Data collected under these projects are utilized to calculate phosphorus loads to Lake Okeechobee, determine compliance with Class I and Class III water quality standards, determine compliance with permitted phosphorus discharge concentrations from individual parcels, report the effectiveness of the FDEP Dairy Rule, and quantify the status of in-Lake water quality and ecological performance measures. The monitoring program was expanded in 2001 to include several components of the Lake Okeechobee Protection Program as follows:

- Contracted with Polk and Orange Counties to perform routine water quality monitoring of a dairy in Polk County under the FDEP Dairy Rule, pool A of the Kissimmee River, and the Kissimmee Chain of Lakes and its tributaries. This action allowed redirection of District staff to higher priority activities;
- Baseline water quality and nutrient loads in Taylor Creek for the Grassy Island STA;
- Phosphorus load monitoring at three dairies for model calibration.

Additional monitoring projects are in the planning or implementation phase. They are:

- Phosphorus load monitoring of C-40 and C-41 for inputs and outputs from the Seminole Indian Tribe Brighton Reservation;
- Partnership between the United States Geological Survey (USGS), USACE, and the District in development of a monitoring network to evaluate the effectiveness of CERP and LOPP projects within the Okeechobee basin;
- Partnership with USGS to monitor the Critical Projects to optimize STA performance;
- A study by Florida International University through a District contract to improve the quality of nutrient load monitoring at pump station S5A. If successful, the methodology may be applied to pump stations S2, S3, and S4 to improve the quality of nutrient load monitoring from backpumping operations into Lake Okeechobee.
- A study by Florida International University through a District contract to improve the quality of nutrient load monitoring at multi-gated District control structures. The study will be performed at S-65E.
- Quantitative monitoring of fisheries and macro-invertebrates as part of the in-Lake restoration evaluation program.

The District continues to evaluate watershed monitoring networks to verify that the appropriate and necessary data are being collected, and that redundant or obsolete efforts are discontinued.

Other specifically identified components of the Research and Monitoring Program include: 1) development of a Lake Okeechobee water quality model; 2) determination of TP sources within the watershed; 3) assessment of TP sources from the Upper Kissimmee Chain of Lakes and Lake Istokpoga; 4) assessment of water management practices within the watershed; and 5) evaluation of the feasibility of alternative nutrient reduction technologies. All of these projects are underway and on schedule to meet the deadlines set forth in the Lake Okeechobee Protection Act. For more information on these projects, refer to the appendix.

Lake Okeechobee Exotic Species

The District has been carrying out an effective program to eradicate melaleuca, and is beginning to implement a program, in cooperation with FDEP, to control torpedograss. Until recently, torpedograss spread unchecked in the Lake's littoral zone, displacing valuable native plant communities. Scientists at the District have worked closely with managers to identify the optimal treatment methods for killing this invasive grass. During 2000-2002, the coordinating agencies treated over 5,000 acres of torpedograss. A much larger area of the littoral zone will be treated in future years, as the acres of torpedograss continue to increase despite initial control efforts. Present efforts are using a combination of controlled fire and the contact herbicide Arsenal®. Because Arsenal® is a non-selective herbicide, one issue of concern is how to achieve good control of torpedograss while allowing native plants to re-colonize treated sites. A major focus of the exotic plant research in 2002-2003 is screening alternative herbicides that can more selectively control torpedograss, and in evaluating the potential for use of bio-control agents against this exotic plant. Experts are also evaluating whether or not torpedograss can spread by seeds, as suggested by some limited previous work. The answer will dramatically affect the scope and duration of torpedograss control on the Lake.

The Lake Okeechobee Protection Act Exotic Species Plan was completed by the due

date of June 1, 2002 (www.sfwmd.gov/koe_section/2_lakeokee). The Plan identifies the exotic species that threaten native flora and fauna within the watershed and Lake and describes the measures being taken to protect these systems. The Plan also incorporates management efforts on public conservation lands within the watershed. The exotic species listed are the plants and animals that have been determined to be the primary species within the watershed and Lake that require management of existing invasions or, in the case of some of the animal species, monitoring of possible future invasions. The species lists were compiled based on discussions of interagency staff and current management efforts within the region. In the future, other plants and animals may be added to the list as new threats are discovered. In addition, while there are other exotic species within the watershed that threaten agricultural activities and warrant additional focus, this plan only attempts to address exotic species that threaten native flora and fauna.

The approach to implementation of the exotic species plan has been, and will continue to be, through the cooperative efforts of local, regional, state and federal agencies. The program goal for each primary exotic plant species is maintenance level control, rather than complete eradication. Maintenance control results in the use of less herbicides, less organic deposition in aquatic environments, less overall environmental impacts from the weeds and associated management activities, and reduced management costs.

Lake Okeechobee Internal Phosphorus Management

The Lake Okeechobee Sediment Management Feasibility Study is in the process of assessing the benefits, potential concerns, and costs associated with alternatives for addressing the internal phosphorus loading issue. An objective methodology that allows for review and input by experts and interested parties will be used throughout the study process. The study is considering both sediment removal with beneficial reuse and chemical treatment technologies.

The Lake Okeechobee Pilot Dredging Project is evaluating the feasibility and cost-effectiveness of removing the phosphorus-laden mud layer in the Lake using innovative dredging, material processing, and water treatment technologies. A demonstration project was completed in May 2002. A final report describing the project will be completed in December 2002.

In addition to the accomplishments outlined above, which were initiated to meet future year statutory requirements in the law, the coordinating agencies have met all the specific Calendar Year 2002 requirement deadlines.

Challenges/Unresolved Issues/Major Uncertainties

- Funds for monitoring phosphorus reductions by nonagricultural BMPs
- Amending the Works of the District Rule to better interface with LOPP projects including the FDACS BMP Rule and adopting nonagricultural BMPs into the Works of the District program.

Encumbrances and Expenditures for 2000, 2001, and 2002

Table 2 indicates the distribution of funding, encumbrances, and expenditures for the State-appropriated funds from year 2000, 2001, and 2002. Although indicating a slow

start in the expenditure of funds, significant progress has been made with many of the programs as indicated in the attached project summaries.

Table 2. Year 2000, 2001, and 2002 State Funding Appropriations, Encumbrances and Expenditures for the Lake Okeechobee Protection Program.

Description	Appropriation	Contract Agreement Executed / Encumbered	Expended	Balance	Comments
FDACS - FY01 One-time appropriation, 1591-G, 2000-01 GAA	**$ 15,000,000**				
Salaries, Overhead and Travel			$ 597,154		$450,000 needed annually to support administration of Lake O. Protection Program
Operating Capital Outlay			$ 125,110		
Motor Vehicles			$ 59,904		
Administrative Overhead Transfer			$ 65,992		
Certified Forward Encumbered Funds		$ 313,290			
NRCS contract		$ 150,000	$ 153,000		
Dairy Nutrient Management Assessments & Implementation		$ 1,408,628	$ 235,980		Engineering design and cost-share to implement dairy nutrient management plans
Nutrient management planning for cow/calf operations		$ 585,138	$ 130,000		nutrient management planning and cost-share for cow / calf operations
IFAS cow/calf research and demonstration project		$ 1,827,178	$ 183,206		research and demonstration for BMP development
TOTAL FOR FDACS	**$ 15,000,000**	**$ 4,284,234**	**$ 1,550,346**	**$ 9,165,420**	
SFWMD - FY01 Appropriation $23,500,000	**Appropriation**	**Contract Agreement Executed / Encumbered**	**Expended**	**Balance**	**Comments**
P Source Control Grant Program					
3 Year Leased Position - Senior Planner	$ 205,505		$ 62,625	$ 142,880	
Training	$ 2,000			$ 2,000	
Berryman & Henigar - Engineering Oversight Contract	$ 300,000	$ 226,276	$ 73,724		
LO Torpedograss Management	$ 500,000		$ 500,000		
Davie Dairy, Inc.	$ 95,270	$ 700	$ 94,570		$63,385 was withdrawn (leachate project) and applied to Milking Dairy
Smith Okeechobee Farms, Inc.	$ 409,560	$ 409,560			
Evans Properties, Inc.	$ 157,000	$ 10,000	$ 147,000		
Okeechobee Utility Authority, Ousley	$ 506,000		$ 506,000		
Tampa Farm Service	$ 1,300,810	$ 1,240,810	$ 60,000		
Irene Lofton	$ 92,000	$ 13,500	$ 78,500		
Aquaflorida, Inc.	$ 516,600	$ 407,580	$ 108,420		
SWA of PBC	$ 1,125,000	$ 1,125,000			

SFWMD - FY01 Appropriation $23,500,000	Appropriation	Contract Agreement Executed / Encumbered	Expended	Balance	Comments
P Source Control Grant Program					
Daniel & Marcia Candler	$ 120,000	$ 30,000	$ 90,000		
Hydromentia, Inc.	$ 1,815,215	$ 886,556	$ 928,659		
QED Environmental	$ 291,655	$ 204,003	$ 87,652		
Milking R. Dairies	$ 63,385	$ 63,100		$ 285	Money transferred from cancelled Davie Dairy project
TOTAL	**$ 7,500,000**	**$ 4,553,985**	**$ 2,737,150**	**$ 208,265**	
Grassy Island					
Taylor Creek STA Land & Land Improvement	$ 8,000,000		$ 8,000,000		
Taylor Creek STA Land Acquisition Cost	$ 500,000		$ 500,000		
Restoration of Isolated Wetlands	**$ 8,500,000**	**$**	**$ 8,500,000**	**$**	
Easement Distributions to landowners	$ 2,425,924		$ 22,067	$ 2,403,857	For easement distribution to land owners.
3 Year Leased Employees - Senior Environmental Scientist, Staff Engineer	$ 286,276		$ 130,943	$ 155,333	
Appraisal Services	$ 12,800		$ 12,800		
Restoration Implementation Contract/Birkett Environmental	$ 875,000	$ 782,321	$ 92,679		
Restoration Implementation Contract/C & N Environmental	$ 750,000	$ 653,974	$ 96,026		
Water Quality Monitoring Contract	$ 150,000	$ 150,000			
TOTAL	**$ 4,500,000**	**$ 1,586,295**	**$ 354,515**	**$ 2,559,190**	
Project Culvert	**$ 3,000,000**				
L-62 Dredging / S-192 Gate & Pump Replacement	$ 1,223,010	$ 924,280	$ 6,295	$ 292,435	In permitting process
PC-01-L59 Culvert Replace	$ 210,000			$ 210,000	In procurement and permitting process
L-63N Dredging	$ 338,800	$ 288,800	$ 4,000	$ 46,000	In permitting process
Taylor Creek Dredging Project	$ 1,228,190				In planning/surveying process
TOTAL	**$ 3,000,000**	**$ 1,213,080**	**$ 10,295**	**$ 1,776,625**	
TOTAL FOR SFWMD	**$ 23,500,000**	**$ 7,353,360**	**$ 11,601,960**	**$ 4,544,680**	
GRAND TOTAL FOR LAKE OKEECHOBEE FY01 APPROPRIATION	**$ 38,500,000**	**$ 11,637,594**	**$13,152,306**	**$ 13,710,100**	
Description	**Appropriation**	**Contract Agreement Executed / Encumbered**	**Expended**	**Balance**	
SFWMD - FY02 Legislative Appropriation for Lake Okeechobee Restoration	**$ 10,000,000**				
In-lake restoration projects (berm removal, Kreamer Is., etc.)	$ 1,950,000	$ 1,724,863	$ 177,068	$ 48,069	

Public-Private BMP Partnership	$ 2,750,000			$ 2,750,000	First Solicitation Cancelled - Re-solicited Nov. 15 2002
DEP Non-Ag Collaboration	$ 575,000		$ 575,000		
Cow-Calf BMP's	$ 450,000		$ 450,000		

Description	Appropriation	Contract Agreement Executed / Encumbered	Expended	Balance	
SFWMD - FY02 Legislative Appropriation for Lake Okeechobee Restoration	**$ 10,000,000**				
Isolated Wetland Research	$ 700,000		$ 700,000		
Industrial Canal Sediment Removal	$ 500,000		$ 500,000		
Pahokee Harbor Sediment Removal	$ 250,000	$ 240,000	$ 10,000		
Belle Glade Marina Sediment Removal	$ 250,000	$ 250,000			
Glades Co/Moore Haven – Strm/Wst. Plan Update	$ 250,000		$ 250,000		
Okee. Co. Strm/Wastewater Plan Update	$ 175,000		$ 175,000		
Watershed Assessments	$ 232,431	$ 229,661	$ 2,770		Transferred $167,569.00 to other projects (see below)
Vegetation Replanting	$ 25,000			$ 25,000	Transferred $20,000 to Torry Island Nature Center
Torpedograss Control Studies	$ 110,000	$ 80,000	$ 30,000		
Model Uncertainty Refinement	$ 398,750	$ 314,310	$ 77,600	$ 6,840	Transferred $20,250 to Property Appraisal
LO Pilot Dredging Confined Disposal Facilities	$ 48,500	$ 48,430		$ 70	Transferred $8,500 from Watershed Assessments
LO Planning Contract/LO Blue Book Reporting	$ 100,000	$ 29,531	$ 70,469		
Expert Assistance	$ 95,000	$ 5,460	$ 45,224	$ 44,316	
Regulatory Assessments	$ 330,000	$ 330,000			
Equipment / Supplies	$ 62,212		$ 10,940	$ 51,272	Transferred $8,788 to Torpedograss Bio-Control
3 Year Leased Employees - Staff Engineer, (2) Senior Engineer's	$ 540,000		$ 90,324	$ 449,676	
Assessment of Water Control Practices in the Four Priority Basins of LO Watershed	$ 159,069	$ 103,955	$ 11,500	$ 43,614	Money transferred from Watershed Assessments
Torry Island Nature Center - Design	$ 20,000	$ 20,000			Money Transferred from Vegetation Replanting
Property Appraisal	$ 20,250		$ 20,250		Money Transferred from Model Uncertainty Refinement
Torpedograss Biocontrol	$ 8,788	$ 8,788			Money Transferred from Equipment / Supplies
GRAND TOTAL FOR FY02 APPROPRIATION	**$ 10,000,000**	**$ 3,240,755**	**$ 3,175,895**	**$ 3,583,350**	
Description	**Appropriation**	**Contract Agreement Executed / Encumbered**	**Expended**	**Balance**	
SFWMD - FY02 Legislative Appropriation for Lake Okeechobee Restoration	**$ 7,500,000**				
Alternative Phosphorus Reduction Technologies Feasibility Study	$ 100,000	$ 70,136	$ 9,612	$ 20,252	
Implementation of Water Control Practices	$ 250,000			$ 250,000	Waiting on assessment results
Pilot STA Performance Optimization	$ 200,000			$ 200,000	
LOADSS Model Upgrade	$ 50,000			$ 50,000	
BMP Implementation	$ 3,748,250			$ 3,748,250	In planning/evaluation process
L. Okeechobee Protection Plan Development	.$ 110,000	$ 110,000			

S-310 Seawall stabilization/Industrial Canal	$ 315,000	$ 315,000			
NRCS Spectral Nutrient Evaluation	$ 100,000			$ 100,000	Agreement to be developed
Optimization of Torpedograss Herbicide Treatment	$ 70,000			$ 70,000	
L. Okeechobee Regional Public-Private Partnership	$ 2,000,000			$ 2,000,000	In solicitation 11/15/02
Best Available Tech for Dairies	$ 427,750			$ 427,750	In permitting phase
Buck Island Ranch Study	$ 129,000	$ 129,000			
GRAND TOTAL FOR FY02 APPROPRIATION	**$ 7,500,000**	**$ 624,136**	**$ 9,612**	**$ 6,866,252**	

Even in the short period of time since receiving the 2002 Legislative appropriation, progress is being made. Most noteworthy are the initiation of the alternative nutrient removal technologies evaluations and assessment of water control practices in the watershed. All other projects are in the procurement or planning process.

Future Legislative Support

Continued funding will be required in future years to attain the restoration targets identified in the Lake Okeechobee Protection Program. The coordinating agencies respectfully request the Governor and Legislature to favorably consider the following project requests. The projects are listed in descending order of priority, so that Project #1 is the highest priority. Several of these projects are multiyear efforts; the amounts identified below reflect the amounts requested only for FY03-04.

1) Continuation of the Public/Private Partnership Program **–** This program is designed to encourage the participation of the private sector in the implementation of phosphorus control technologies. Due to the positive response from the private sector during the first release, additional funds are being requested. Total requested: $2,000,000.

2) Implementation of Nutrient Management Practices and Best Available Technologies for Dairies **-** The purpose of this project is to implement, monitor, and evaluate the nutrient management practices and effective BATs to improve water runoff quality on dairies in the Okeechobee watershed. BMPs have failed to achieve phosphorus load reductions to the SWIM-mandated targets; these new technologies are needed to meet the SWIM target and ultimately, the TMDL for the Lake. This project also includes technology transfer to other dairy farmers in the watershed, so that the most environmentally and economically sound technologies can be implemented on a basin-wide scale. Total requested: $6,000,000.

3) Water Quality Monitoring for the Lake Okeechobee Protection Program - This project will provide monitoring of water quality and quantity as defined in the Lake Okeechobee Protection Program, which is above the current level of effort. This monitoring program encompasses additional nutrient load monitoring within the northern Lake Okeechobee watershed for those project areas that fall outside the Lake Okeechobee CERP Watershed Project and works constructed under the Lake Okeechobee Critical Projects Stormwater Treatment Areas. The total project cost is for capital and operational costs of the monitoring program for an eight-year period. The FY03-04 costs are for startup and operation costs for this initiatives. Total requested: $500,000

4) Urban Best Management Practices – This project includes the retrofit/rehabilitation of secondary drainage systems from subdivisions along the perimeter of the Lake. The project will provide assistance with maintenance dredging and retrofits of secondary canals, including Buckhead Ridge, Treasure Island, and Taylor Creek Isles. This should be conducted in coordination with the USACE, which has primary responsibility for navigation dredging. Total requested: $1,000,000.

5) Optimization of sub-regional water management practices in the watershed – This project will include the installation of water control structures and control mechanisms in the Lake to retain stormwater in the watershed. Total requested: $2,000,000.

6) Collection of quantitative information on major processes in the Lake's nitrogen cycle, including nitrification, denitrification, and nitrogen-fixation. Because the Lake is presently

nitrogen-limited and dominated by nitrogen-fixing blue-green algae (cyanobacteria), its response to phosphorus load reduction will largely depend on in-Lake dynamics of phosphorus and nitrogen. We have detailed information on in-Lake phosphorus dynamics from past work by UF scientists, but little information on nitrogen. This directly impacts our ability to accurately model Lake responses to nutrient reduction. Total requested: $250,000.

7) Beef Cattle BMP Study - In order to achieve the phosphorus load target and hasten Lake Okeechobee's recovery, it is necessary to find ways to reduce phosphorus in runoff from beef cattle pastures. The collaborative research project at Buck Island Ranch (operating cattle ranch) seeks to evaluate a series of BMPs to protect and enhance Lake Okeechobee, while minimizing negative economic impacts to the agricultural community by including input from the stakeholder community. Total requested: $250,000.